

Background Document for Capacity Analysis for Land Disposal Restrictions— Phase IV (Supplement): Newly Identified Mineral Processing Wastes (Proposed Rule)

TABLE OF CONTENTS

	<u>Page</u>
1. INTRODUCTION	1-1
1.1 LEGAL BACKGROUND	1-1
1.2 SUMMARY OF THE CAPACITY ANALYSIS METHODOLOGY	1-2
1.2.1 Determination of Required Commercial Treatment Capacity	1-4
1.2.2 Determination of Available Commercial Treatment Capacity	1-5
1.3 SUMMARY OF CAPACITY ANALYSIS RESULTS	1-6
1.4 ORGANIZATION OF BACKGROUND DOCUMENT SUPPORTING THE CAPACITY ANALYSIS	1-7
2. AVAILABLE TREATMENT CAPACITY	2-1
2.1 STABILIZATION CAPACITY	2-1
2.2 METAL RECOVERY CAPACITY	2-2
2.3 VITRIFICATION CAPACITY	2-2
2.4 WASTEWATER TREATMENT SYSTEMS CAPACITY	2-4
2.5 MIXED RCRA/RADIOACTIVE WASTE CAPACITY	2-5
3. CAPACITY ANALYSIS	3-1
3.1 REGULATORY BACKGROUND	3-1
3.2 DATA SOURCES	3-2
3.2.1 ANPRM Comments	3-3
3.2.2 National Survey of Solid Waste from Mineral Processing Facilities (RTI Survey)	3-3
3.2.3 Comments to Bevill Rules	3-4
3.2.4 EPA Sampling Data	3-5
3.2.5 §3007 Data (1989)	3-5
3.2.6 Data from Effluent Guidelines Development Documents	3-6
3.2.7 §3007 Data (1994)	3-6
3.2.8 Data Submitted by FMC Corporation	3-6
3.2.9 Other Data Sources	3-6
3.3 METHODOLOGY AND ASSUMPTIONS	3-7
3.4 SOIL AND DEBRIS CONTAMINATED WITH NEWLY IDENTIFIED MINERAL PROCESSING WASTES	3-28
3.5 MIXED RCRA/RADIOACTIVE WASTES	3-28
3.6 RESULTS	3-29

CHAPTER 1 INTRODUCTION

This document presents the capacity analysis that EPA conducted to support the proposed Land Disposal Restrictions (LDRs) — Phase IV: Newly Identified Mineral Processing Wastes (Supplemental Rule). EPA conducts capacity analyses to evaluate the need for national capacity variances from the land disposal prohibitions.¹ The capacity analysis provides estimates of the quantities of wastes that will require alternative commercial treatment prior to land disposal as a result of the LDRs and estimates alternative commercial treatment capacity available to manage wastes restricted from land disposal. In this rule, EPA is proposing LDRs for newly identified and listed mineral processing wastes.

1.1 LEGAL BACKGROUND

The Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA), enacted on November 8, 1984, set basic new priorities for hazardous waste management. Land disposal, which had been the most widely used method for managing hazardous waste, is now the least preferred option. Under HSWA, EPA must promulgate regulations restricting the land disposal² of hazardous wastes according to a strict statutory schedule. As of the effective date of each regulation, land disposal of wastes covered by that regulation is prohibited unless (1) the waste meets the treatment standards that have been established, or (2) it can be demonstrated that there will be no migration of hazardous constituents from the disposal unit for as long as the waste remains hazardous.

Under the LDR Program, EPA must identify levels or methods of treatment that substantially reduce the toxicity of a waste or the likelihood of migration of hazardous constituents from the waste. Whenever possible, the Agency prefers to define treatment in terms of performance (i.e., maximum acceptable concentrations of hazardous constituents in the treated waste or residuals), rather than in terms of specific treatment methods, and thus provide the regulated community with flexibility in complying with the LDRs. EPA's standards are generally based on the performance of the best demonstrated available technology (BDAT) for that waste, as documented by treatment data collected at well-designed and well-operated systems using that technology, or are based on data derived from the treatment of similar wastes that are as difficult or more difficult to treat.

The LDRs are effective immediately upon promulgation unless the Agency grants a national capacity variance from the statutory date because of a lack of available treatment capacity (see RCRA section 3004(h)(2)). For every waste, EPA considers — on a national basis — both the capacity of commercially available treatment technologies and the quantity of restricted wastes currently sent to land disposal for which on-site treatment capacity is not available. If EPA determines that adequate alternative commercial treatment capacity is available for a particular waste, the land disposal restriction is effective immediately. If not, the Agency establishes an alternative effective date based on either the earliest date on which adequate treatment capacity will be available or two years, whichever is less. Once the variance expires, the wastes must meet the LDR treatment standards prior to being land disposed.

¹ The LDRs are effective when promulgated unless the Administrator grants a national capacity variance from the otherwise applicable date and establishes a different date (not to exceed two years beyond the statutory deadline) based on: "... the earliest date on which adequate alternative treatment, recovery, or disposal capacity which protects human health and the environment will be available" (RCRA section 3004(h)(2)).

² RCRA defines land disposal "to include, but not be limited to, any placement of such hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave" (RCRA section 3004(k)).

RCRA also allows generators to apply for extensions to the LDRs on a case-by-case basis for specific wastes generated at a specific facility for which there is not adequate capacity (RCRA section 3004(h)(3)). EPA may grant case-by-case capacity variances to applicants who can demonstrate that: (1) no capacity currently exists anywhere in the U.S. to treat a specific waste, and (2) a binding contractual commitment is in place to construct or otherwise provide alternative capacity, but due to circumstances beyond the applicant's control, such alternative capacity cannot reasonably be made available by the effective date (40 CFR 268.5).³

HSWA's schedule divided hazardous wastes into three broad categories: solvent and dioxin wastes; California list wastes;⁴ and "scheduled" wastes. Exhibit 1-1 summarizes the previous LDR rulemakings and their respective promulgation dates. EPA restricted surface disposed solvents and dioxins from land disposal on November 7, 1986 and deep well injected solvents and dioxins from land disposal on July 26, 1998. The final rule for California list wastes, which was issued on July 8, 1987, covers wastes originally listed by the State of California and adopted intact within HSWA. The "scheduled" wastes consist of all wastes that were identified or listed as hazardous prior to November 8, 1984 but were not included in the first two categories listed above. HSWA's statutory timetable required that EPA restrict one-third of these wastes by August 8, 1988, two-thirds by June 8, 1989, and the remaining third by May 8, 1990. For hazardous wastes that are newly identified or listed after November 8, 1984, EPA is required to promulgate land disposal prohibitions within six months of the date of identification or listing (RCRA section 3004(g)(4)). However, the statute does not provide an automatic prohibition of land disposal of such wastes if EPA fails to meet this deadline.

1.2 SUMMARY OF THE CAPACITY ANALYSIS METHODOLOGY

In evaluating the need for national capacity variances, EPA estimates the quantities of waste requiring alternative commercial treatment as a result of the LDRs and the capacity

³ RCRA also allows generators to petition for a variance from treatment standards if the waste cannot be treated to meet LDR standards due to its chemical or physical properties. These variances are known as treatability variances (40 CFR 268.44).

⁴ The "California list" comprises the following classes of wastes: liquid hazardous wastes with a Ph of less than or equal to 2.0 (acidic corrosive wastes); all liquid hazardous wastes containing free cyanides, various metals, and polychlorinated biphenyls (PCBs) exceeding statutory concentration levels; and all wastes (liquid, sludge, or solid) containing halogenated organic compounds (HOCs) in concentrations greater than or equal to specified statutory levels.

EXHIBIT 1-1
SUMMARY OF PREVIOUS LAND DISPOSAL RESTRICTIONS RULEMAKINGS

Rulemaking	Federal Register Notice	Date
Solvents and Dioxins (surface disposed)	51 <i>FR</i> 40572	November 7, 1986
Solvents and Dioxins (deep well injected)	53 <i>FR</i> 28188	July 26, 1988
California List (surface disposed)	52 <i>FR</i> 25760	July 8, 1987
California List (deep well injected)	53 <i>FR</i> 30908	July 26, 1988
First Third Rule	53 <i>FR</i> 31138	August 8, 1988
First Third Rule (deep well injected)	54 <i>FR</i> 25416	June 7, 1989
Second Third Rule	54 <i>FR</i> 26594	June 8, 1989
Third Third Rule	55 <i>FR</i> 22520	May 8, 1990
Newly Listed and Identified Wastes (Phase I)	57 <i>FR</i> 37194	June 30, 1992
Interim Final Rule for Vacated Treatment Standards	58 <i>FR</i> 29860	May 24, 1993
Organic TC Wastes and Newly Listed Wastes (Phase II)	59 <i>FR</i> 47982	September 19, 1994
Decharacterized Wastewaters, Carbamate and Organobromine Wastes, and Spent Potliners (Phase III) (Proposed Rule)	60 <i>FR</i> 11702	March 8, 1995
Issues Associated With Clean Water Act Treatment Equivalency, and Treatment Standards for Wood Preserving Wastes and Toxicity Characteristic Metal Wastes (Phase IV) (Proposed Rule)	60 <i>FR</i> 43654	August 22, 1995

available at commercial treatment facilities to manage the restricted wastes.⁵ By comparing the capacity demand with the available commercial capacity, EPA can identify capacity shortfalls and make determinations concerning national capacity variances. This section provides an overview of EPA's methodology in estimating required commercial treatment capacity, briefly summarizes the capacity analysis conducted for today's rule, and highlights the national capacity variances that EPA is proposing in today's rule.

1.2.1 Determination of Required Commercial Treatment Capacity

Required commercial treatment capacity represents the quantity of wastes currently being land disposed that cannot be treated on site and, consequently, will need commercial treatment to meet the LDR treatment standards. Required commercial capacity also includes the residuals generated by treatment of these wastes (i.e., the quantity of generated residuals that will need treatment prior to land disposal).

EPA identifies the waste streams potentially affected by the LDRs by types of land disposal units, including surface impoundment, waste pile, land treatment unit, landfill, and underground injection well. Salt dome formations, salt bed formations, and underground mines and caves are additional methods of land disposal that are affected by the LDRs; however, because insufficient information is available to document the quantity of wastes disposed by these three methods, these methods generally are not addressed in the analysis of required alternative capacity.

To determine the type of alternative capacity required to treat the affected wastes, EPA conducts a "treatability analysis" of each waste stream. Based on the waste's physical and chemical form and information on prior management practices, EPA assigns the quantity of affected waste to an appropriate technology (i.e., a technology that can meet the treatment standards). Mixtures of RCRA wastes (i.e., waste streams described by more than one waste code) present special treatability concerns because they often contain constituents (e.g., organics and metals) requiring different types of treatment. To treat these wastes, EPA develops a treatment train that can treat all waste types in the group (e.g., incineration followed by stabilization of the incinerator ash). In these cases, the Agency estimates the amount of residuals that would be generated by treatment of the original quantity of waste and includes these residuals in the quantities requiring alternative treatment capacity.

EPA identifies the quantities of waste requiring alternative treatment on a facility level basis; if the appropriate treatment technology is not available on site, or if adequate available capacity is not present to manage the waste, then the appropriate quantity of waste requiring alternative treatment is aggregated into a

⁵ EPA also derived estimates of affected facilities and waste quantities for the regulatory impact analysis (RIA). However, the goals of a capacity analysis and an RIA are very different, which often results in reasonable differences in methodologies, data, and results. A first step to satisfying the goals of a capacity analysis is to make a "threshold" determination concerning whether a national treatment capacity variance is needed for the two years following promulgation of a waste's LDR treatment standards, or not at all. Thus, EPA estimates the required and available commercial treatment capacity for all affected wastes and facilities, but often only to the extent needed to make this threshold determination. For example, when upper-bound estimates of required capacity are well below lower-bound estimates of available capacity, then generally a variance is not needed and the analysis can stop. Results that are ambiguous during this first step generally require EPA to conduct further analyses. In contrast to the capacity analysis' focus on required and available capacity during the next two years and its initial focus on threshold determinations, the RIA concentrates on estimating specific potential significant (or dominant) long-term costs and benefits of the LDR treatment standards. Thus, the RIA does not conduct a threshold analysis of treatment capacity. Furthermore, the RIA evaluates affected facilities and wastes over a much longer time frame.

national demand for commercial capacity. EPA excludes from the estimates of required commercial capacity those wastes that are managed in on-site treatment systems.

For today's rule, EPA analyzed required capacity for newly identified mineral processing wastes. EPA identified the potentially affected waste streams by mineral processing sector, estimated the quantities land disposed (i.e., after recycling), estimated the proportions that are expected to exceed characteristic regulatory levels, and assigned quantities to appropriate treatment scenarios.

1.2.2 Determination of Available Commercial Treatment Capacity

Available treatment capacity can be categorized by facility status into four groups:

- (1) commercial capacity - capacity at facilities that manage waste from any facility;
- (2) on-site (private capacity) - capacity at facilities that manage only waste generated on-site;
- (3) captive capacity - capacity at facilities that manage only waste from other facilities under the same ownership; and
- (4) limited commercial capacity - capacity at facilities that manage waste from a limited number of facilities not under the same ownership.

For all capacity analyses, estimates on available capacity generally reflect available commercial capacity. In order to determine whether to grant a national capacity variance for newly listed and identified wastes regulated, EPA analyzes available commercial capacity for alternative treatment technologies capable of meeting the LDR treatment standards. This capacity analyses generally include estimating the maximum or design capacity for appropriate waste management systems and the amount of waste currently going to these systems (utilized capacity). Available capacity is estimated as the difference between maximum and utilized capacity.

For today's rule, EPA analyzed commercial capacity for metal recovery systems, stabilization/vitrification technologies, and wastewater treatment systems. These analyses focused on treatment capacity projected to be available in December 1996, starting from the baseline capacity identified in the proposed Phase IV LDR rule.⁶

⁶ EPA, *Background Document for Capacity Analysis for Land Disposal Restrictions -- Phase IV: Issues Associated with Clean Water Act Treatment Equivalency, and Treatment Standards for Wood Preserving Wastes and Toxic Characteristic Metal Wastes (Proposed Rule)*, August 1995.

1.3 SUMMARY OF CAPACITY ANALYSIS RESULTS

Exhibit 1-2 summarizes the national capacity variance decisions for today's proposed rule. The one-year variance for arsenic nonwastewaters (including soil and debris) is based on EPA's evaluation that, although some treatment capacity currently exists for these wastes, some time is needed for facilities to conduct the modifications needed in their on-site stabilization and other treatment systems or to otherwise make arrangements with off-site treaters. (EPA also is considering further defining which arsenic wastes would not be amenable to available treatments to meet the standards and thus would need the variance. For example, EPA could use criteria such as concentration [as with mercury wastes], metal species, and/or waste characteristics.) Similarly, for high mercury subcategory wastes (including soil and debris), facilities that generate the small quantities that are believed to exist will need time to secure appropriate roasting/retorting capacity. Mixed radioactive wastes (including soil and debris) will require a two-year variance because of the significant shortage of commercial capacity for these wastes; furthermore, any new commercial capacity that becomes available will be needed for mixed radioactive wastes that were regulated in previous LDR rulemakings and whose variances have already expired. For the newly identified mineral processing wastes (including soil and debris) other than those discussed above, a national capacity variance beyond 90 days is not warranted because of the ready availability of commercial capacity for treatments such as stabilization and chemical precipitation.

EXHIBIT 1-2 SUMMARY OF NATIONAL CAPACITY VARIANCES FOR PHASE IV MINERAL PROCESSING WASTES

Waste Category	Effective Date of Land Disposal Prohibition
High mercury subcategory mineral processing wastes (including soil and debris)	One year from promulgation of final rule
Arsenic characteristic mineral processing nonwastewaters (including soil and debris)	One year from promulgation of final rule
Mixed radioactive wastes (including soil and debris)	Two years from promulgation of final rule
Newly Identified mineral processing wastes (including soil and debris) other than above	90 days from promulgation of final rule

1.4 ORGANIZATION OF BACKGROUND DOCUMENT SUPPORTING THE CAPACITY ANALYSIS

EPA has prepared this background document to present the capacity analyses conducted for the proposed Phase IV LDRs. This document is organized into three chapters, as described below:

- **Chapter 1: Introduction.** Provides background, general methodology, and a summary of the analysis.
- **Chapter 2: Available Treatment Capacity.** Describes the methodology and data used to determine available capacity for wastewater treatment, combustion of liquids and solids, and stabilization.
- **Chapter 3: Capacity Analysis for Newly Identified Mineral Processing Wastes.** Discusses the methodology and data used to conduct the capacity analysis for the newly identified mineral processing wastes.